

Magnetostratigraphy of the Nakakoshiki Formation (Eocene), Koshikijima islands, Kagoshima Prefecture

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The Paleogene mammalian record in Kyushu, Japan is extremely important for the Asian Paleogene land mammalian history and chronology. In particular, the Nakakoshiki Formation in the Koshikijima islands, Kagoshima Prefecture and the coeval Akasaki Formation in Amakusa area, Kumamoto Prefecture have produced a rich record of Eocene mammals (the oldest known Eocene mammals fauna in Japan) spanning the early Bridgerian mammal age. Although some zircon U–Pb ages were reported from the uppermost part of the Nakakoshiki Formation and the upper part of the Akasaki Formation, the ages of these formations remain controversial because both formations are composed of fluvial sediments with a poor fossil record. Here, we present the Eocene magnetostratigraphy established in the Nakakoshiki Formation. The Nakakoshiki Formation occupies the basal part of the Kamikoshikijima Group and consists of red and grey mudstone, sandstone, and conglomerate. Six stratigraphic sections exposed along the coastline southern part of Kamikoshiki island were extensively sampled. 83 samples were thermally demagnetized up to a maximum of 700 °C, and the component structure of the NRM was plotted on vector end-point demagnetization diagrams. In addition, in order to identify the magnetic carriers of the rocks, rock magnetic experiments were performed.

Thermal demagnetization of the red mudstone samples revealed three distinct remanent magnetization components, referred to as components A, B, and C, respectively. The last demagnetized component (Component C) with both polarities is interpreted to be the primary magnetization, which is carried by specular hematite with unblocking temperatures between 640°C and 700°C. Based on the polarities of Component C, we established the magnetostratigraphy. Considering the mammal age and radiometric dates reported from the Nakakoshiki Formation, the magnetic polarity zonation is consistent with a correlation to the world magnetic polarity time scale at about 50–52 m.y.

Keywords: Eocene, magnetostratigraphy, Koshikijima islands, Kagoshima Prefecture, Nakakoshiki Formation